An Open Networking Lab for practical open education

Conference or Workshop Item

Open Networking Lab

The Open University

50 YEARS

Online practical learning of computer networking

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OER19, Galway

ufi charitable trust

Vocational learning opportunity

‘Raise UK skill levels by innovative digital solutions for vocational learning’

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cisco Networking Academy

Open Networking Lab

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A free online badged open course

- Teaching the skills of computer networking to beginners
- Experiential learning, practical skills
- Based on a web-based network simulator
- Modes of use:
  - classroom-supported
  - independent, distance learners
- Published on OpenLearn as ~~MOOC~~ BOC
  - open to anyone, anywhere, **anytime**
  - including assessment → badge
  - OER / open courseware

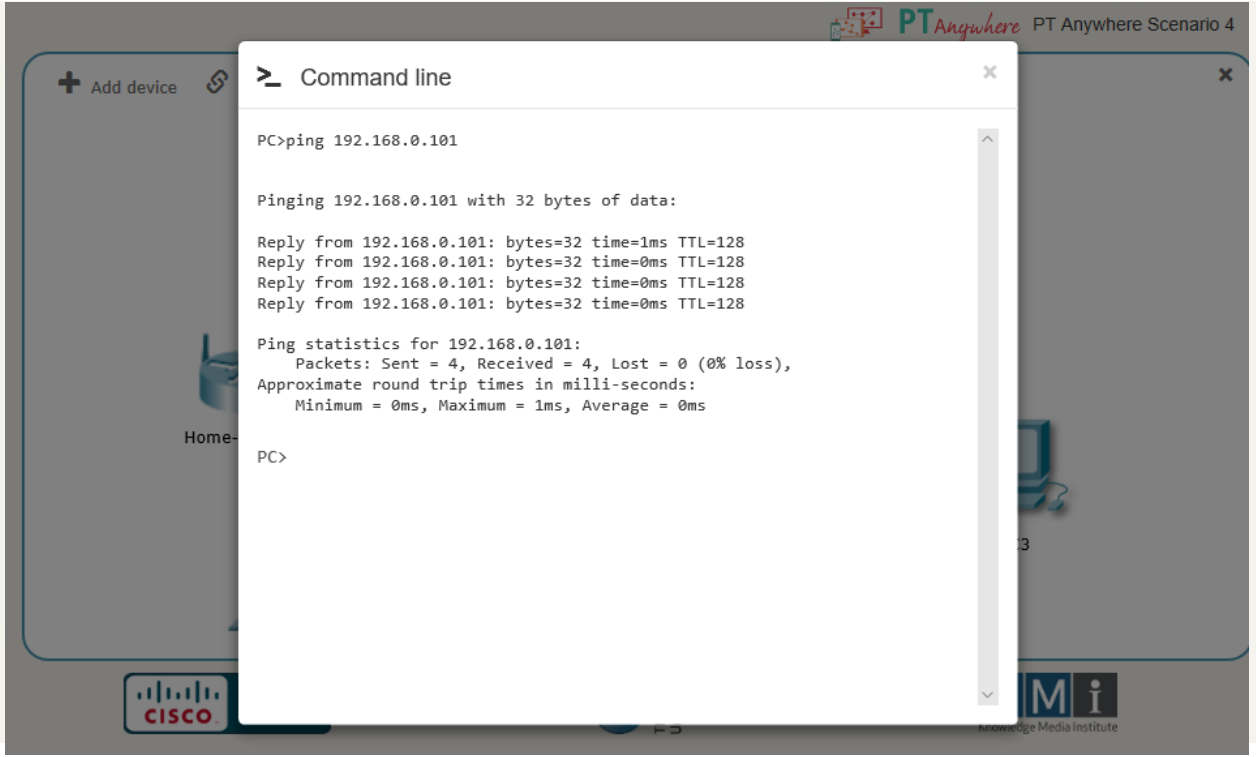
Pedagogy and learning design

- Sfard (1998): acquisition and participation are both necessary for learning
- Acquisition:
  - Some text
  - Mainly videos (screencasts) demonstrating aspects of networking and setting up activities for students to try out in simulation
- Participation:
  - Experiential practical learning
  - Web-based computer network simulator (PT Anywhere)
  - Structured activities and quizzes

Sfard, A. (1998). On Two Metaphors for Learning and the Dangers of Choosing just One. Educational Researcher, Vol. 27, No. 2, pp.4-13

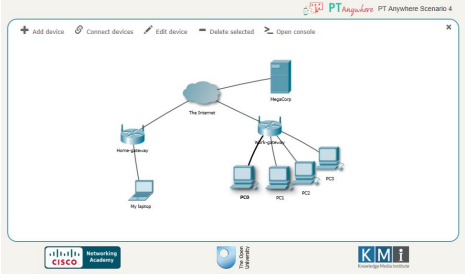
PT Anywhere

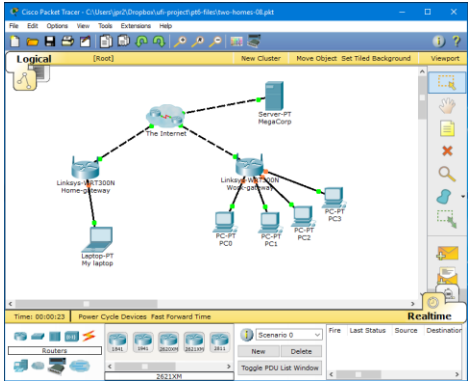
An easy to use network simulator



PT Anywhere

Supports experiential learning, practice based





- Easy to use interface but authentic
- HTML5 - web browser integration

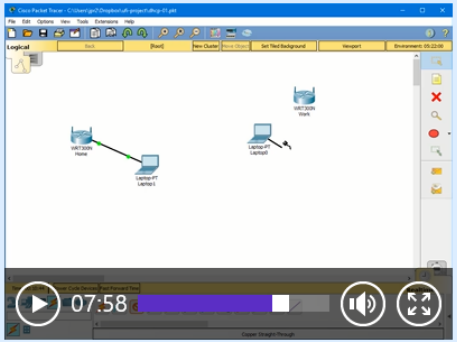
- A simplified user interface to…
  …Cisco Packet Tracer running on server
- Implemented by open API to Packet Tracer
- Code open source
  https://github.com/PTAnywhere

Part 1. Dynamic Host Configuration Protocol (DHCP)

In this part we will look at how networks can be configured so that new devices can join automatically and not have to be configured manually.

Now watch the video below which is about 10 minutes long.

Find out



Download

Find out
Think about
Try it out
Sort it out
Test yourself

Think about

Could you set up a coffee shop wi-fi network?

Customers expect to have wireless access so they can use their tablets and laptops. What would you have to consider when you set up a wi-fi network?

Reveal discussion

Try it out

1. Open PT-Anywhere in a new tab or window so you can read these instructions.
2. In this scenario, there is a home gateway and one PC already connected.
3. Add a laptop to the network.
4. Check the laptop configuration – is DHCP turned on?

Tip: hold Ctrl and click a link to open it in a new tab. (Hide tip)

Sort it out

1. Open PT-Anywhere in a new tab or window so you can read these instructions.
2. In this scenario, there is a home gateway and one PC already connected.
3. Add a laptop to the network and connect it to the gateway.
4. Can you ping the laptop from the PC?
5. Check the laptop and PC configuration – is DHCP turned on?
6. Check the gateway configuration – is DHCP turned on and configured sensibly? *Currently not possible to check this*
7. If not, fix it and try again.

Reveal discussion

Pilot evaluation

FE Colleges

- Students 16+, 18+, adult
- Methods:
  - survey (Likert; open comments)
  - teacher interviews
  - classroom observation
  - analytics (website, simulator)
- Pilot 1: 8 colleges, 121 students
- Pilot 2: 8 colleges, 262 students

Did they learn?

"The included PT activities were really useful. The content was relevant for pure beginners."

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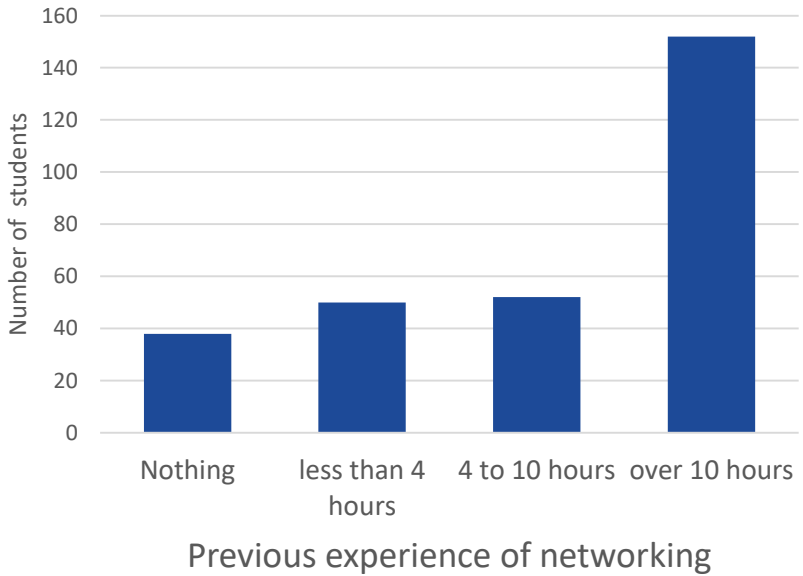
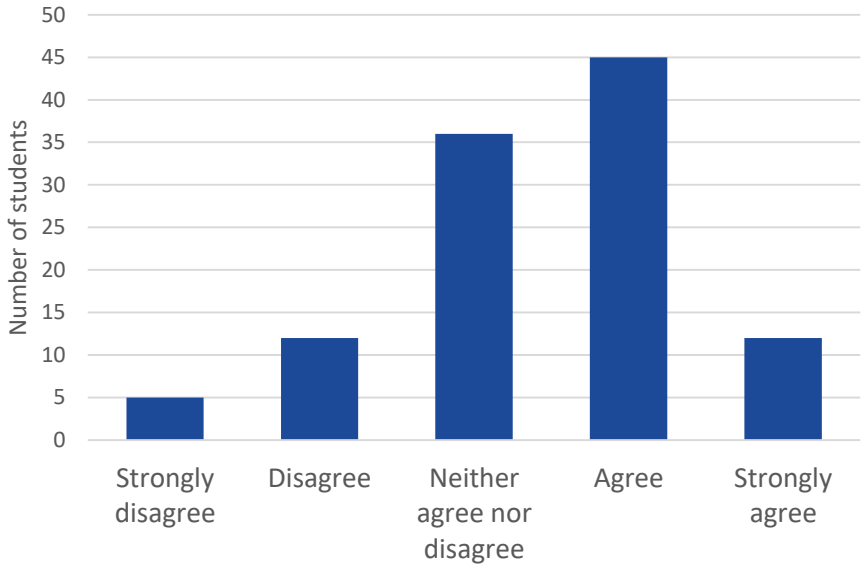
How much did you know about computer networking before starting ONL?

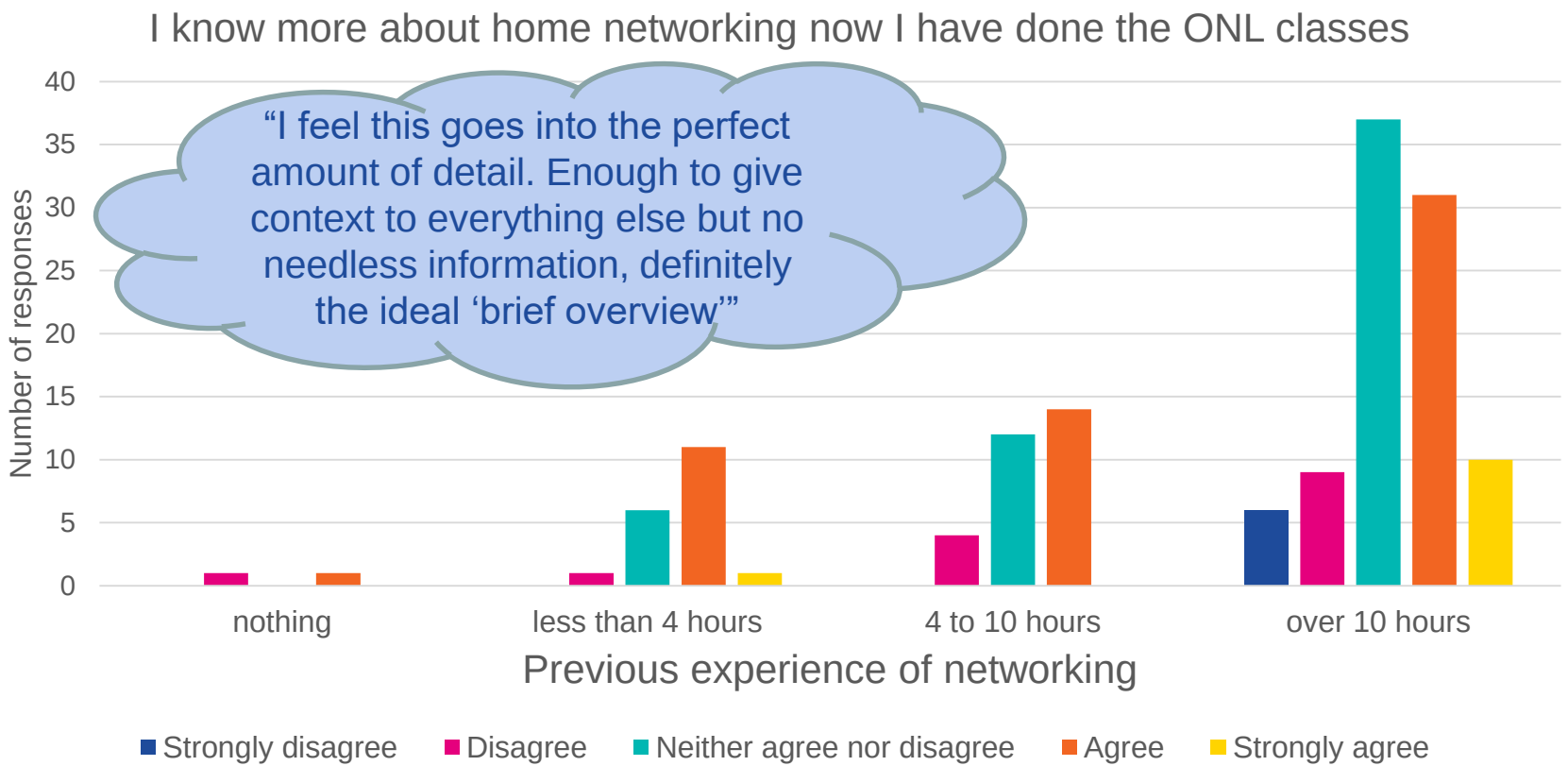


I know more about home networking now I have done the ONL classes

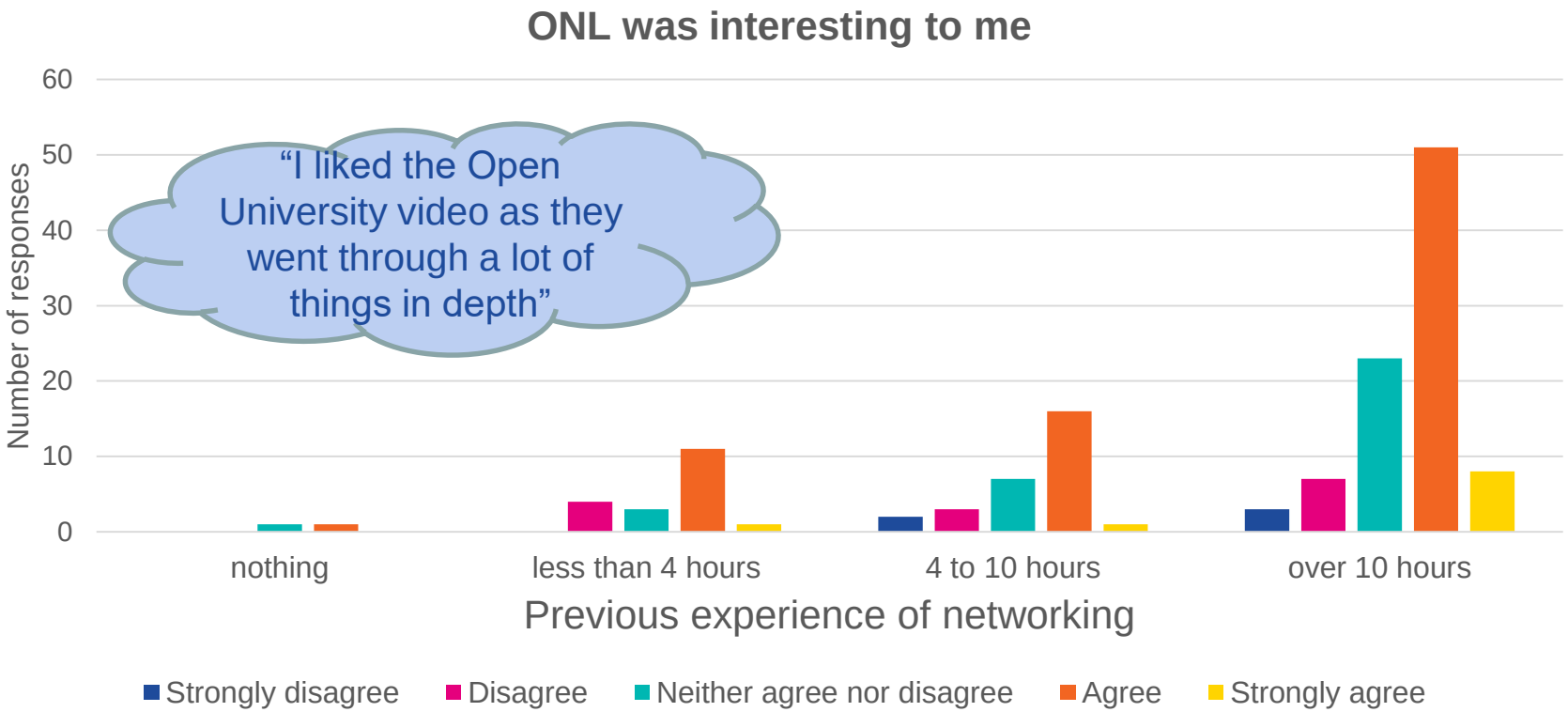


Data from Pilot 1 & Pilot 2 student surveys (left n=292, right n=180)

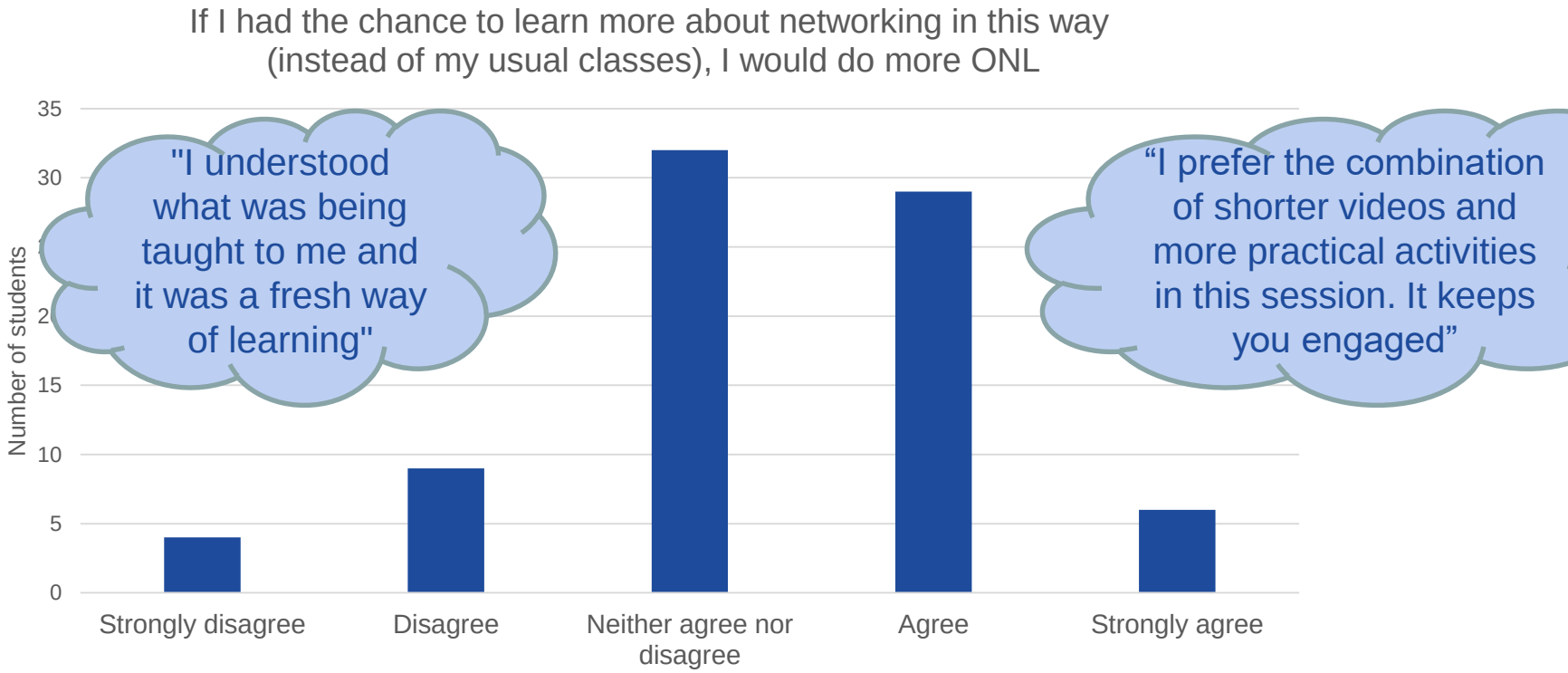
How effective is ONL material?



How engaged were learners?



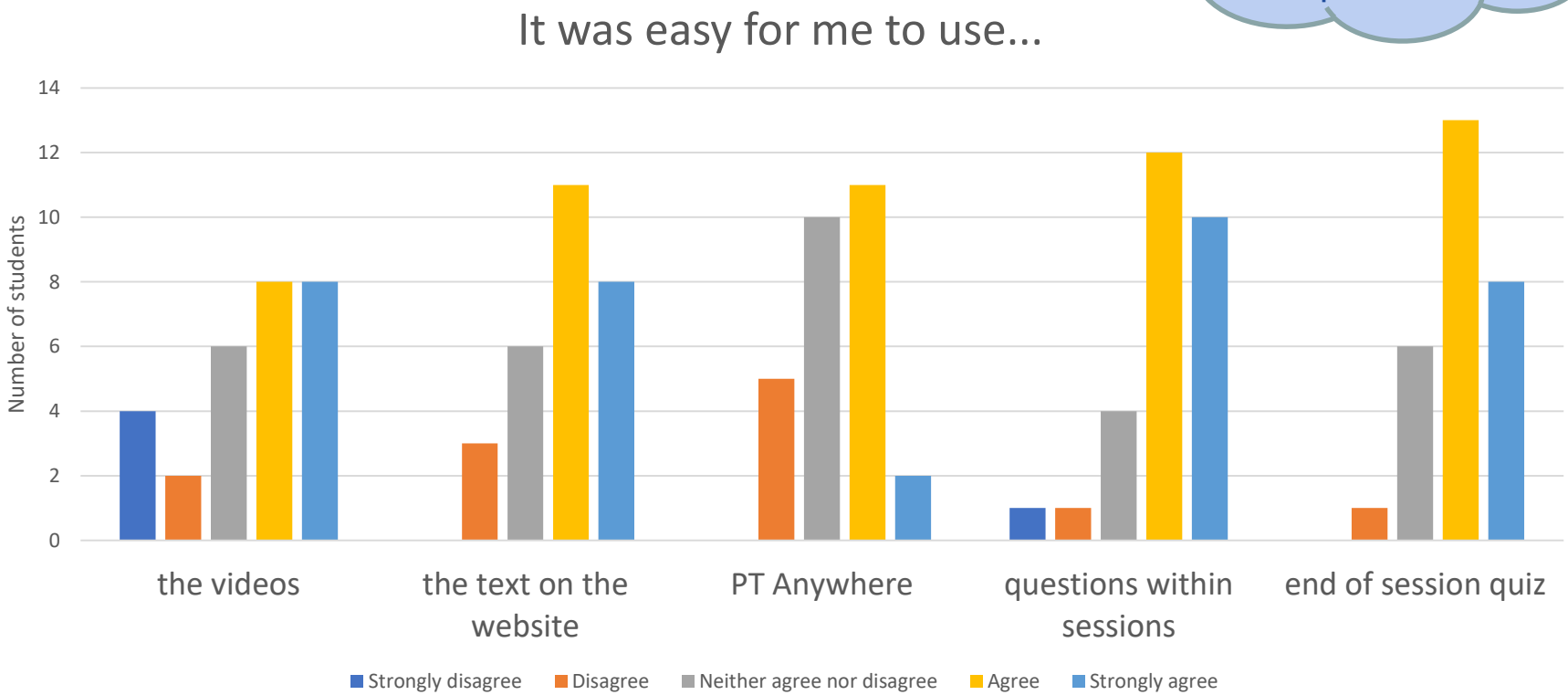
Do learners like the approach?



Data from Pilot 1 student surveys

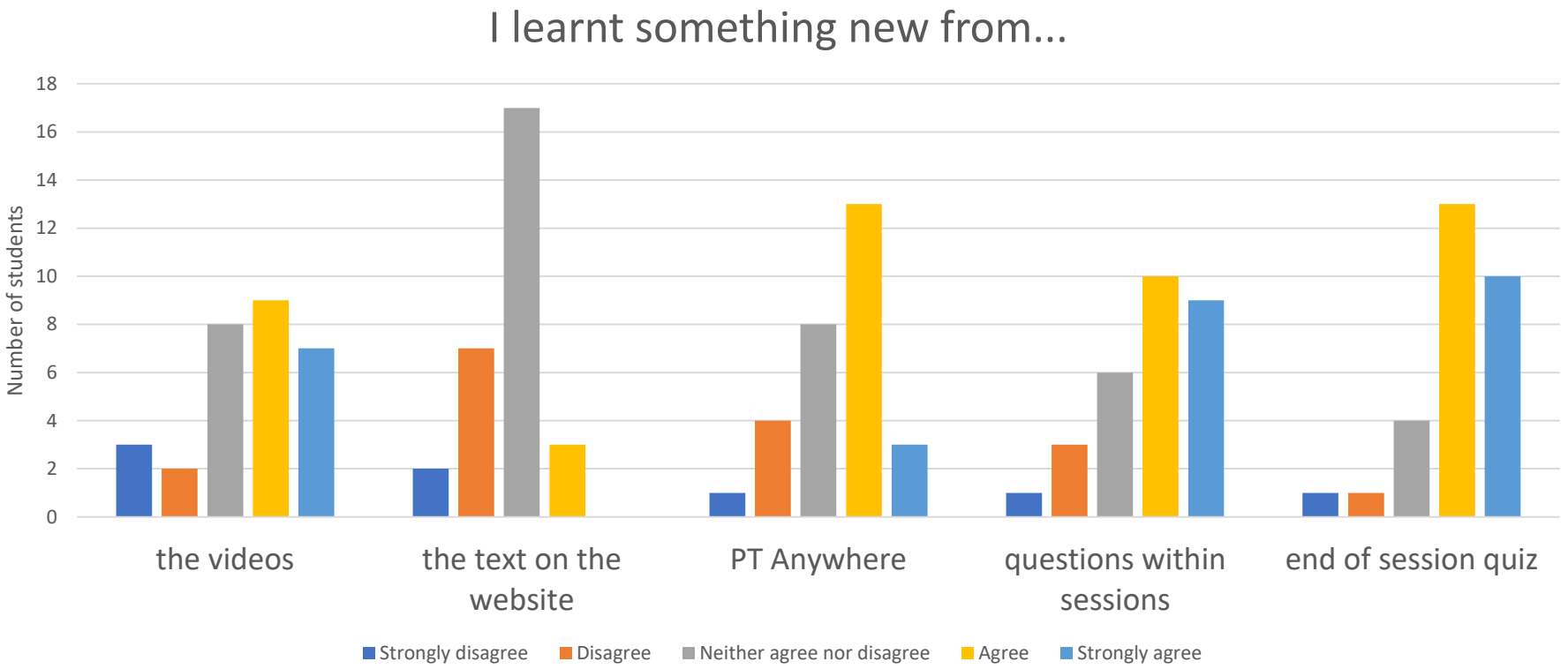
Components – ease of use

"I found it very welcoming for someone of my experience"



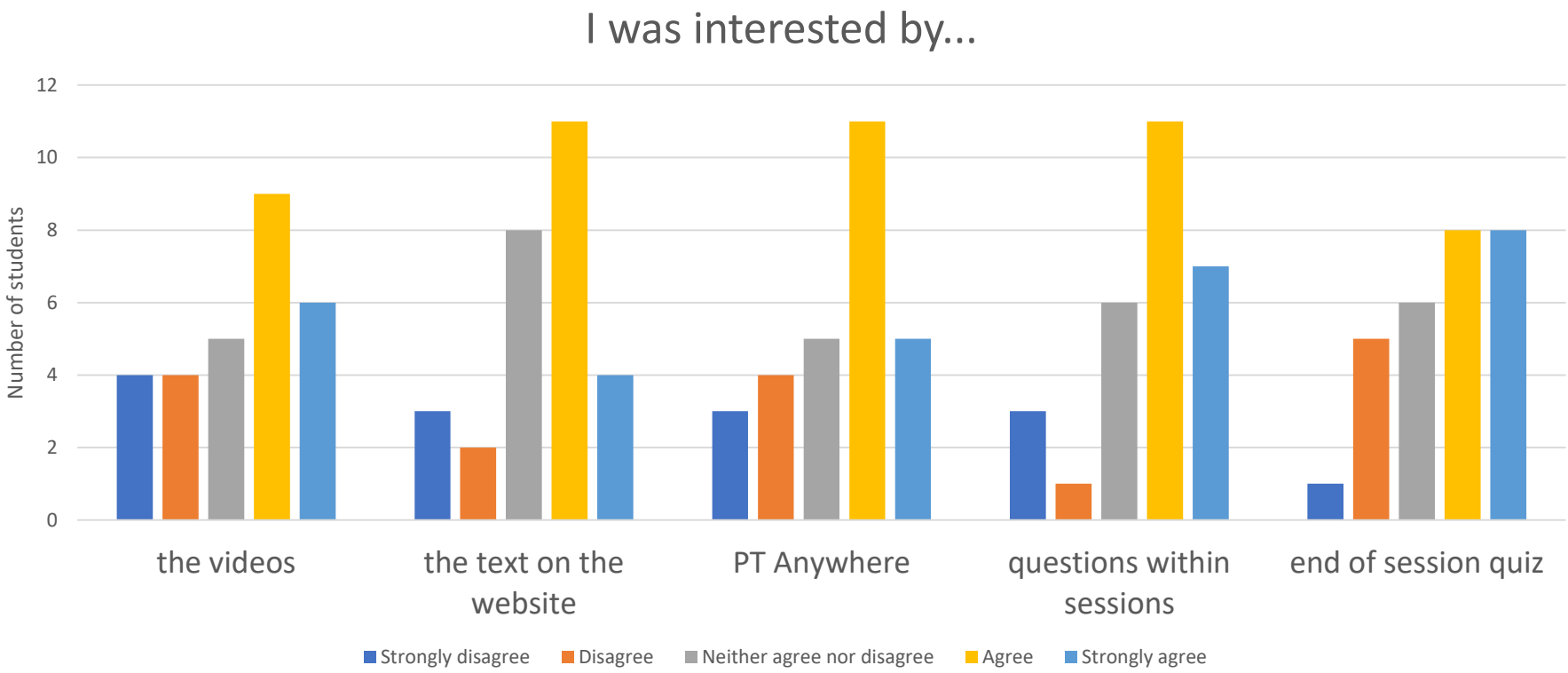
Data from Pilot 2 student surveys (n=28)

Components – learning



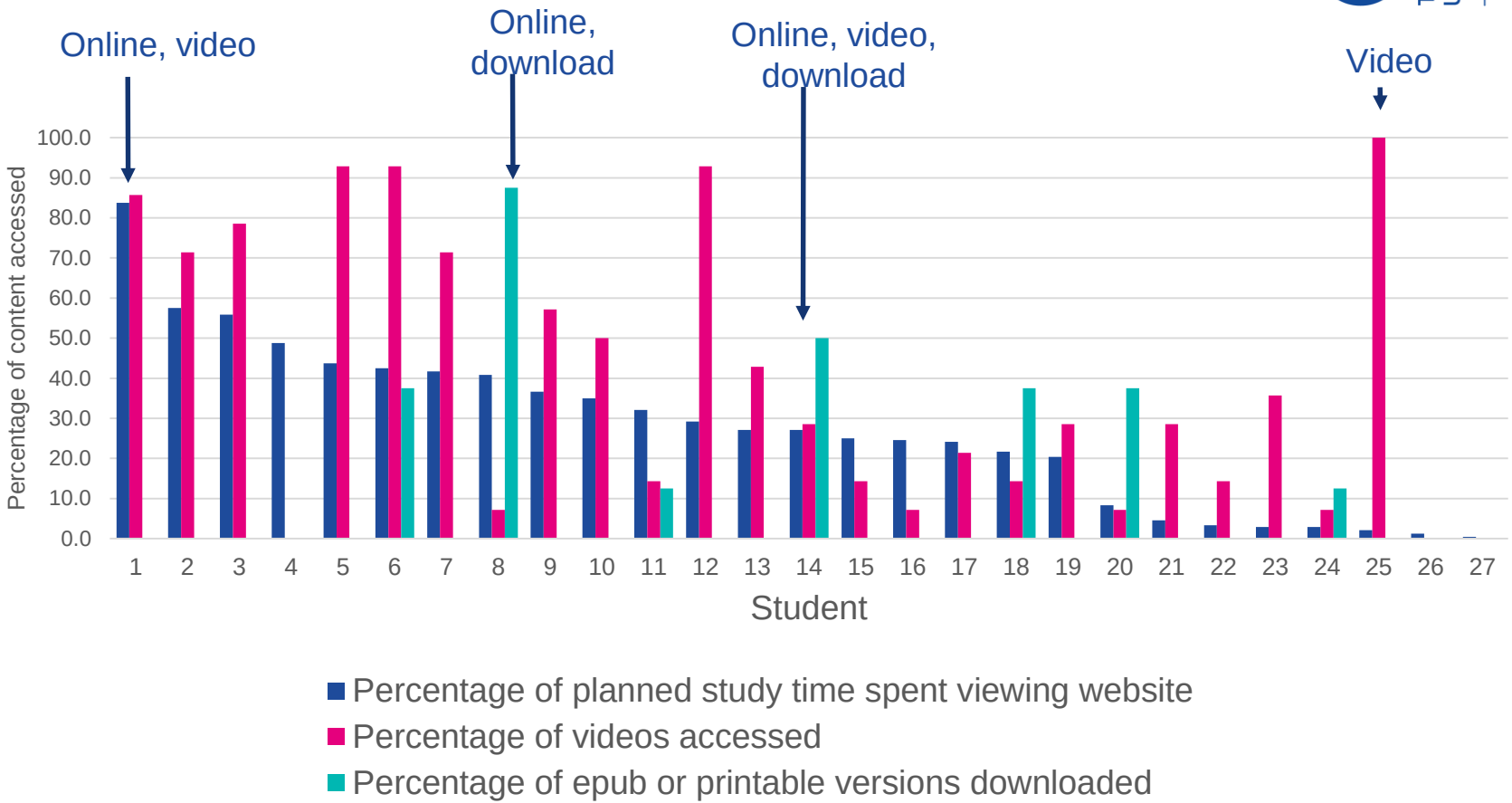
Data from Pilot 2 student surveys (n=29)

Components – engagement



Data from Pilot 2 student surveys (n=29)

Patterns of engagement



Other comments – students

"The included Packet Tracer activities were really useful"

“Would be helpful to have a short quiz after each video, to check understanding, make it more interactive”

“This video is very long and needs to be split into shorter segments of a few minutes each.”

Flexible use

- Both students and teachers used materials in several different ways
  - revision, filling in gaps in knowledge, introduction, replacement for a lesson or series of lessons, individual, pairs, etc
- To support flexible use, teachers wanted:
  - Clear description of possible audiences for ONL
  - Description of how ONL materials fit or augment the curriculum
  - Detailed index of the content, videos and PT anywhere activities
  - Examples or case studies showing how ONL can be used differently

A case study from Pilot 2

- Year 10 (14-15 yrs old)
- Level 1 to 2 BTEC students (beginners in networking)
- Used ONL with one student per computer, using headphones
- One lesson per week
- Studied at their own pace
- Teacher in class for support

Teacher comments

Engagement:
"The interaction is what the Year Tens like to do. They like to be engaged. They like to watch the video. They all had their headphones on and they were able to work at their own pace."

Learning from mistakes:
"They need to make mistakes to learn. And student can get very '*I've made a mistake, I'm not doing it again'.* But because […] everybody was fully immersed in what they were doing, no one took any notice if they were doing it again."

Range of ability:
"It did actually lend itself quite nicely to all abilities. And the fact that they could have a go. They weren't frightened to have another go then."

Teacher comments

Peer support:

“And if one got stuck, then maybe a stronger student would have already done that and he’d go back and support the weaker student, so all of this peer to peer is going on.”

“The peer support was absolutely fantastic. You could see and you would want to encourage it. You don’t normally see that until Year Twelve or Thirteen. But because they were all doing the same thing at the same time, they all had the same information, I actually found that the peer support started quite naturally within the classroom.”

Student comments

“I believe it was a very good and informative course. However, I found the videos whilst informative where too long in certain places and the scripts were generic. Overall though, I enjoyed it.”

“hard to navigate but otherwise good”

“my experiences was helpful and very fun to do”

“it was a really good and helpful experience”

“preety difficalt yo get my grips around the navigation on the site and some of the questions on the quizz were confusing to understand.”

Looking forward, looking back

What's next:

- Publish on OpenLearn as free badged open course
  - open to anyone, anywhere, anytime
  - including assessment → badge
- Publish on OpenLearn Create for reuse & remix
- Promote to the community

Looking back

- Open educational practices more difficult than OER!

Open Networking Lab http://onl.kmi.open.ac.uk/

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